

SCIENCE – First Grade

1st Nine Weeks

Scientific Investigation, Reasoning, and Logic

- 1.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
- the senses are used to observe differences in physical properties;
 - observations are made from multiple positions to achieve a variety of perspectives and are repeated to ensure accuracy;
 - objects or events are classified and arranged according to characteristics or properties;
 - simple tools are used to enhance observations;
 - length, mass, volume, and temperature are measured using nonstandard units;
 - inferences are made and conclusions are drawn about familiar objects and events;
 - a question is developed from one or more observations;
 - predictions are made based on patterns of observations;
 - observations and data are recorded, analyzed, and communicated orally and with simple graphs, pictures, written statements, and numbers; and
 - simple investigations and experiments are conducted to answer questions.

Life Processes

- 1.4 The student will investigate and understand that plants have basic life needs and functional parts and can be classified according to certain characteristics. Key concepts include
- plants need nutrients, air, water, light, and a place to grow;
 - basic parts of plants; and
 - plants can be classified based on a variety of characteristics.

Interrelationships in Earth/Space Systems

- 1.6 The student will investigate and understand the basic relationships between the sun and Earth. Key concepts include
- the sun is the source of energy and light that warms the land, air, and water; and
 - the sun's relative position in the morning is east and in the late afternoon is west.

2nd Nine Weeks

Matter

- 1.3 The student will investigate and understand how different common materials interact with water. Key concepts include
- some liquids will separate when mixed with water, but others will not;
 - some solids will dissolve in water, but others will not; and
 - some substances will dissolve more readily in hot water than in cold water.

Force, Motion, and Energy

- 1.2 The student will investigate and understand that moving objects exhibit different kinds of motion. Key concepts include
- objects may have straight, circular, and back-and-forth motions;
 - objects may vibrate and produce sound; and
 - pushes or pulls can change the movement of an object.

3rd Nine Weeks

- 1.5 The student will investigate and understand that animals, including humans, have basic needs and certain distinguishing characteristics. Key concepts include
- basic needs include adequate air, food, water, shelter, and space (habitat);
 - animals, including humans, have many different physical characteristics; and
 - animals can be classified according to a variety of characteristics.

Earth Patterns, Cycles, and Change

- 1.7 The student will investigate and understand weather and seasonal changes. Key concepts include
- changes in temperature, light, and precipitation affect plants and animals, including humans;
 - there are relationships between daily and seasonal changes; and
 - changes in temperature, light, and precipitation can be observed and recorded over time.

4th Nine Weeks**Earth Resources**

1.8 The student will investigate and understand that natural resources are limited. Key concepts include

- a) identification of natural resources;
- b) factors that affect air and water quality; and
- c) recycling, reusing, and reducing consumption of natural resources.

First Grade Science: First Nine Weeks

VA Standards of Learning (SOL) Essential Understandings for Instruction	Content Knowledge and Skills	MCPS Adopted Materials	Supporting Materials
<p>1.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which</p> <ul style="list-style-type: none"> • The nature of science refers to the foundational concepts that govern the way scientists formulate explanations about the natural world. The nature of science includes the following concepts: <ul style="list-style-type: none"> a) the natural world is understandable; b) science is based on evidence, both observational and experimental; c) science is a blend of logic and innovation; d) scientific ideas are durable yet subject to change as new data are collected; e) science is a complex social endeavor; and f) scientists try to remain objective and engage in peer review to help avoid bias. <p>In grade one, an emphasis should be placed on concepts a, b, and e.</p> <ul style="list-style-type: none"> • Science assumes that the natural world is understandable. Scientific inquiry can provide explanations about nature. This expands students' thinking from just a knowledge of facts to understanding how facts are relevant to everyday life. • Science demands evidence. Scientists develop their ideas based on evidence and they change their ideas when new evidence becomes available or the old evidence is viewed in a different way. • Science is a complex social endeavor. It is a complex social process for producing knowledge about the natural world. Scientific knowledge represents the current consensus as to what is the best explanation for phenomena in the natural world. This consensus does not arise automatically, since scientists with different backgrounds from all over the world may interpret the same data differently. To build a consensus, scientists communicate their findings to other scientists and attempt to replicate one another's 	<p>Standard 1.1 does not require a discrete unit on scientific investigation because the inquiry skills that make up the standard should be incorporated in all the other 1st grade science standards. Each skill has been connected to specific content within this curriculum guide, but teachers may also provide instruction in any of the skills throughout the school year.</p> <p>In order to meet this standard, it is expected that students will:</p> <ul style="list-style-type: none"> • use their senses and simple tools, such as a magnifying glass and a balance to enhance their observations of physical properties. • make repeated observations of an object or event from multiple positions. • classify and arrange objects or events according to at least two attributes or properties so that similarities and differences become apparent. • measure length, mass, and volume, using nonstandard units. • use familiar events and objects to make inferences and draw conclusions. • develop a question from one or more observations. • predict outcomes based on actual observations and evidence rather than random guesses. • communicate observations and data with simple graphs and pictures, oral and written statements, and with numbers. • answer questions by conducting simple experiments/investigations, using nonstandard measuring units and simple tools, such as a magnifying glass or a balance. A simple experiment is one that changes only one thing 		<p>AIMS <u>Primarily Plants</u> Seed Sort</p> <p>OrganWise Guys Here We Are! Puzzle</p> <p>Emotions Kit Activity Book</p> <p>Hardy Heart/Calci M. Bone/ Windy Lungs Activity Book</p> <p>Smart from the Inside Out Activity Book</p>

<p>findings. In order to model the work of professional scientists, it is essential for first-grade students to engage in frequent discussions with peers about their understanding of their investigations.</p> <ul style="list-style-type: none"> • To communicate an observation accurately, one must provide a clear description of exactly what is observed and nothing more. • Observations should be made from multiple positions (e.g., observations of the same object from the front of the object, from the back of the object, looking down on the object, etc.) whenever possible to achieve a variety of perspectives. • Observations should be repeated multiple times to assure accuracy. • Once the characteristics of several objects or several events have been observed and recorded, the objects or events can be arranged by those characteristics (e.g., several objects sorted by color, several events sorted on a timeline by age, etc.). • Simple tools, such as a magnifying glass and a balance can extend the observations that people can make. • Nonstandard units such as paper clips, a student's foot, index cards, etc., can be used to measure the length of objects. The mass of two objects can be compared by holding each object in a different hand. The volume of various liquids can be compared by pouring them in cups of the same size. Variations in temperature of different objects can be compared by the difference that is felt when each object is touched. Variations in air temperature can be compared by observing the differences one feels when in different environments (e.g., inside the classroom vs. outside on the playground in winter, inside the freezer compartment of a refrigerator vs. inside a kitchen). • An inference is a tentative explanation based on background knowledge and available data. • A conclusion is a summary statement based on data from the results of an investigation. • Questions about what is observed can be developed. • A prediction is a forecast about what may happen in some future situation. It is based on information and 	<p>at a time (tests only one variable), gives quick results, and provides easily observable changes.</p> <ul style="list-style-type: none"> • record observations of movement (length/distance) using nonstandard units. • compare the movement of objects, using graphs, pictures, and/or numbers. 		
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<p>evidence. A prediction is different from a guess.</p> <ul style="list-style-type: none">• Graphs are powerful ways to display data, making it easier to recognize important information. Describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.• Data should be displayed in bar graphs and picture graphs at the grade one level.• An experiment is a fair test designed to answer a question.			
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First Grade Science: First Nine Weeks

<p>VA Standards of Learning (SOL) Essential Understandings for Instruction</p>	<p>Content Knowledge and Skills</p>	<p>MCPS Adopted Materials</p>	<p>Supporting Materials</p>
<p>1.4 The student will investigate and understand that plants have life needs and functional parts and can be classified according to certain characteristics.</p> <p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"> Plants have basic needs, including nutrients, air, water, light, and a place with sufficient space to grow. Plants have different structures that serve different functions in growth, survival, and reproduction. The functions of plant parts include the roots which hold plants in place and absorb water, seeds which make new plants, leaves which make food for the plant, and stems which hold the plants upright and transport materials up and down the plant. Plants can be categorized by their different characteristics, such as edible/nonedible, flowering/nonflowering, and evergreen/deciduous. Students do not need to know the terms nonedible, edible, evergreen, and deciduous. The focus should be on the concept, not the terminology. 	<p>In order to meet this standard, it is expected that students will:</p> <ul style="list-style-type: none"> conduct simple experiments/investigations related to plant needs by changing one variable (nutrients, air, water, light, or place to grow) at a time. Students do not need to know the term variable. create and interpret a model/drawing of a plant, including seeds, roots, stems, leaves, flowers, and fruits. identify the functions of the seed, root, stem, and leaf. classify plants by the characteristics of edible/nonedible, flowering/nonflowering, and evergreen/deciduous, using charts. <p>Skills</p> <ol style="list-style-type: none"> the senses are used to observe differences in physical properties. 	<p>VASOL p. 7-12</p>	<p>AIMS <u>Primarily Plants</u> What Do Plants Need to Grow? Make a Terrarium Inside a Seed Seeds Travel The Seed Within Observe a Leaf Stem Study Super Tuber Root Study Flowers Seed Sort</p> <p><u>Spring Into Math and Science</u> Sponge Garden</p> <p><u>The Budding Botanist</u> Observe a Tree</p> <p><u>Fall Into Math and Science</u> Apples A-Peel to Me</p> <p><u>Enhanced Scope and Sequence Plus</u> Plant Needs</p>

First Grade Science: First Nine Weeks

<p>VA Standards of Learning (SOL) Essential Understandings for Instruction</p>	<p>Content Knowledge and Skills</p>	<p>MCPS Adopted Materials</p>	<p>Supporting Materials</p>
<p>1.6 The student will investigate and understand the basic relationships between the sun and the Earth.</p> <p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"> • The sun provides Earth with light (a form of radiant energy) and thermal energy. • By transferring thermal energy to Earth, Earth’s atmosphere and land are heated. Thermal energy may be transferred from one substance to another by three means: conduction, convection, and radiation. • The sun provides energy, which warms the land, air, and water on Earth. • The sun’s relative position in the morning is east and in the late afternoon is west. 	<p>In order to meet this standard, it is expected that students will:</p> <ul style="list-style-type: none"> • infer that sunlight striking an object makes the object warmer. • conduct simple experiments to show how sunlight changes the temperature of land, air, and water. • interpret the relationship between the sun’s position in the sky and the general time of day. This includes the sun’s relative position in the morning (east), at noon, and in the late afternoon (west). <p>Skills</p> <ul style="list-style-type: none"> a. the senses are used to observe differences in physical properties. 		<p>AIMS <u>Cycles of Knowing and Growing Sky Watchers</u></p> <p><u>Enhanced Scope and Sequence Plus</u> Energy from the Sun Positions of the Sun</p>

First Grade Science: Second Nine Weeks

<p>VA Standards of Learning (SOL) Essential Understandings for Instruction</p>	<p>Content Knowledge and Skills</p>	<p>MCPS Adopted Materials</p>	<p>Supporting Materials</p>
<p>1.3 The student will investigate and understand how different common materials interact with water.</p> <p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"> • Different types of materials act differently when mixed with water. • Some liquids will mix with water, while others will not. • Some solids will dissolve in water, while others will not. • The temperature of the water affects how easily a substance will dissolve in it. 	<p>In order to meet this standard, it is expected that students will:</p> <ul style="list-style-type: none"> • describe and apply the term dissolve. • predict and describe how various materials (vinegar, milk, baking soda, powdered drink mix, sugar, salt, sand, oil, soil, rocks) act when mixed with water. • classify liquids and solids into those that will dissolve in water and those that will not. Use tables and/or charts to record and display the information. • infer that some substances will dissolve more easily in hot water than in cold water by conducting investigations using water at different temperatures. <p>Skills</p> <ul style="list-style-type: none"> d. simple tools are used to enhance observations. b. observations are made from multiple positions to achieve a variety of perspectives and are repeated to ensure accuracy. e. length, mass, volume, and temperature are measured using nonstandard units. g. a question is developed from one or more observations 		<p>AIMS Spring Into Math and Science Making Ice Cream Blue Wave</p> <p>Enhanced Scope and Sequence Plus Dissolving Solids Dissolving Solids in Hot and Cold Water</p>

First Grade Science: Second Nine Weeks

<p>VA Standards of Learning (SOL) Essential Understandings for Instruction</p>	<p>Content Knowledge and Skills</p>	<p>MCPS Adopted Materials</p>	<p>Supporting Materials</p>
<p>1.2 The student will investigate and understand that moving objects exhibit different kinds of motion.</p> <p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"> • An object’s motion may be described by tracing and measuring its position over time. The motion of objects may be straight, circular, curved, or back-and-forth. • One kind of back-and-forth motion is vibration. Vibrations may create sound. • Pushing or pulling can change the position and motion of objects. For the same object, the size of the change is related to the strength of the push or pull. 	<p>In order to meet this standard, it is expected that students will:</p> <ul style="list-style-type: none"> • Make and communicate observations about moving objects. Examples should include balls, objects with wheels, windup toys, tops, rubber bands, and playground equipment. • Predict an object’s movement, using its size, shape, and the force of the push or pull on it. • Manipulate objects in order to describe and classify the motion of each object as straight, circular, or back-and-forth. • Understand that vibrations may create sound, such as humming, strumming a guitar, or plucking a rubber band. • Record observations of movement (length/distance), using nonstandard units. <p>Skills</p> <ul style="list-style-type: none"> b. observations are made from multiple positions to achieve a variety of perspectives and are repeated to ensure accuracy. d. simple tools are used to enhance observations. e. length, mass, and volume are measured using nonstandard units. g. a question is developed from one or more observations. 		<p>AIMS Primarily Physics Sound is Vibration Traveling Sounds The Lion That Roars Musical Instruments</p> <p>Spring into Math and Science The Sounds of Music</p> <p>Enhanced Scope and Sequence Plus Motion of Objects Vibrations</p> <p>SHIP Move to the Motion</p>

First Grade Science: Third Nine Weeks

<p>VA Standards of Learning (SOL) Essential Understandings for Instruction</p>	<p>Content Knowledge and Skills</p>	<p>MCPS Adopted Materials</p>	<p>Supporting Materials</p>
<p>1.5 The student will investigate and understand that animals, including people, have life needs and specific physical characteristics and can be classified according to certain characteristics.</p> <p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"> Animals, including people, have basic life needs, including air, food, water, shelter, and space (habitat). Students do not need to know the term habitat. The focus should be on the items that are necessary components of a habitat, not on the terminology. Body coverings include hair, fur, feathers, scales, and shells. Appendages are parts, such as arms, legs, wings, fins, and tails, which extend from the main body and have specific functions. Students do not need to know the term appendage. The focus should be on the concept, not the terminology. Methods of movement may include walking, crawling, flying, and swimming. Simple ways to classify animals are whether they are wild or domestic and whether they live on land or in water. 	<p>In order to meet this standard, it is expected that students will:</p> <ul style="list-style-type: none"> make and communicate observations of live animals, including humans, about their needs, physical characteristics, and where they live. describe the life needs of animals, including air, food, water, shelter, and space. identify and chart simple characteristics by which animals can be classified, including body coverings (hair, fur, feathers, scales, and shells), body shape, appendages (arms, legs, wings, fins, and tails), methods of movement (walking, crawling, flying, and swimming), wild or domestic, and water homes or land homes. distinguish between wild animals (raccoon, hawk, squirrel, shark) and domestic animals (dog, cat, sheep) and recognize examples of each. infer types of animal homes (water or land), using the physical characteristics of the animals, such as scales and fins that allow fish to live and move in water or fur and legs that allow dogs to live and move on land. classify animals by where they live (their homes). <p>Skills</p> <p>c. objects or events are classified and arranged according to attributes or properties.</p>	<p>VASOL p. 13-18</p>	<p>AIMS <u>Critters</u> Popping through the Garden Home on the Range Hide and Seek</p> <p><u>Bats Incredible</u> Mammals on my Mind Noses for Nectar Microbat and Megabat</p> <p><u>Cycles of Knowing and Growing</u> Fallen Leaf</p> <p><u>Enhanced Scope and Sequence Plus</u> Classifying Animals</p> <p>Virginia Tech Science Outreach Program Birds Kit Includes study skins of some common birds and materials to aid in teaching about birds: posters and graphics, a field guide, activities, bones and feathers, and a bird song tape.</p> <p>OrganWise Guys Bone Bank Savings A Healthy Victory All Hearts Need Love An Active Bone Life Breakfast Skippin' Blues Calci's Big Race Clean Air March Extreme Couch Potato Farmer's Market Fresh Five a Day Reporter Gimme Five</p>

		<p>H2)hhhhhhh! Helping You Feel Safe I think I forgot Something My Favorite Drink in the World Pepto's Party Portions School Days Herre We Come Taking a Healthy Break The Heart of a Winner</p> <p>SHIP Habitat Sort</p> <p>Gifted Resources Let's Bug Out</p> <p>Survive and Thrive</p>
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First Grade Science: Third Nine Weeks

<p>VA Standards of Learning (SOL) Essential Understandings for Instruction</p>	<p>Content Knowledge and Skills</p>	<p>MCPS Adopted Materials</p>	<p>Supporting Materials</p>
<p>1.7 The student will investigate and understand the relationship of seasonal change and weather to the activities and life processes of plants and animals.</p> <p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"> Seasonal changes bring about changes in plants, animals, and people. With seasonal changes come changes in weather, including temperature, light, and precipitation. Precipitation includes rain, snow, and ice. Changes in plants include budding, growth, and losing leaves. Some animals hibernate and some animals migrate as a result of seasonal changes, resulting in changes in habitat. Students do not need to know the terms migration, hibernation, and habitat. The focus should be on the concepts, not the terminology. Hibernation is a state of greatly reduced metabolic activity and lowered body temperature adopted by certain mammals as an adaptation to adverse winter conditions. Most animals are not “true hibernators” but rely on a combination of reserve body fat, stored food supplies (in rodents only), and a protected den to enable it to survive the winter. At intervals of several weeks the animal elevates its body temperature, awakens, moves about, feeds, and then returns to its state of torpor. Migration is the regular, usually seasonal, movement of all or part of an animal population to and from a given area. The distance traveled may be a few miles or several thousands of miles. Animals migrate for many different reasons. Some animals migrate to find better sources of food, water, or shelter. Other animals migrate to visit particular breeding grounds, rear their young, or 	<p>In order to meet this standard, it is expected that students will:</p> <ul style="list-style-type: none"> identify types of precipitation as rain, snow, and ice and the temperature conditions that result in each one. relate a temperature, light, and precipitation chart to the corresponding season (daily or weekly). observe and chart changes in plants, including budding, growth, and losing leaves. Recognize in what season budding and losing leaves will most likely occur. predict how an outdoor plant would change through the seasons. compare and contrast the four seasons of spring, summer, fall (autumn) and winter in terms of temperature, light, and precipitation. compare and contrast the activities of some common animals (e.g., squirrels, chipmunks, butterflies, bees, ants, bats, frogs, and humans) during summer and winter by describing changes in their behaviors and body covering. compare and contrast how some common plants (e.g., oak trees, pine trees, and lawn grass) appear during summer and winter. comprehend at an introductory level that some animals respond to seasonal changes by hibernating (e.g., frogs, bats) or migrating (e.g., some birds and butterflies). (It may be useful to recognize common Virginia animals that hibernate and migrate, but the specific names of animals are not the focus of student learning here.) infer what the season is from people’s dress, recreational activities, and work activities. 	<p>VASOL p. 27 -30</p>	<p>AIMS <u>Cycles of Knowing and Growing</u> Fallen Leaf</p> <p><u>Primarily Bears</u> Teddy Bears Dress for Summer, Winter, Fall, and Spring</p> <p><u>Enhanced Scope and Sequence Plus</u> Seasonal Changes Weather Patterns and Seasonal Changes</p> <p>SHIP <u>Season Sort</u></p>

<p>find warmer climates. The frequency of animals' migrations also differs.</p> <ul style="list-style-type: none"> • An animal's living place is called its habitat. Most animals are only adapted to live in one or two habitats. Earth has many different environments, varying in temperature, moisture, light, and many other factors. Each of these habitats has distinct life forms living in it, forming complex communities of interdependent organisms. A habitat must include a source of food for the animal, a source of water for the animal, access to some sort of shelter for the animal, and an adequate amount of space so that enough habitat components are available to the animal. Some animals' habitats are very small, but some animals require a large amount of space. • The body coverings of some animals change with the seasons. This includes thickness of fur and coloration. • Changes made by people include their dress, recreation, and work. 	<p>Skills</p> <ul style="list-style-type: none"> d. simple tools are used to enhance observations. f. inferences are made and conclusions are drawn about familiar objects and events. h. predictions are made based on patterns of observations. i. observations and data are recorded, analyzed, and communicated orally and with simple graphs, pictures, written statements, and numbers. 		
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First Grade Science: Fourth Nine Weeks

<p>VA Standards of Learning (SOL) Essential Understandings for Instruction</p>	<p>Content Knowledge and Skills</p>	<p>MCPS Adopted Materials</p>	<p>Supporting Materials</p>
<p>1.8 The student will investigate and understand that natural resources are limited.</p> <p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"> Natural resources provide us with the things we need in order to live, including food, clothing, water, air, shelter, land, and energy. What we put into the air, especially the products of the fuels we burn, affects the quality of the air. Waste produced by animals, including humans, and factories can affect the quality of water. Some pollution washes from yards, streets, and farms. Many natural resources are limited and cannot be renewed. Other resources are limited and cannot be renewed, but they may last a very long time. Recycling recovers used materials. Many materials can be recycled and used again, sometimes in different forms. Recycling helps to save our natural resources. An example of a recycled material is newspapers that are turned into writing tablets. Reusing materials means using them more than once. Examples include using dishes and utensils that are washed after use rather than using paper plates and plastic utensils and putting them in the trash. Resources will last longer if we recycle them, reuse them, or reduce consumption of them. The creation of parks can help preserve land. Parks have many uses, including recreation. 	<p>In order to meet this standard, it is expected that students will:</p> <ul style="list-style-type: none"> identify natural resources such as plants and animals, water, air, land, minerals, forests, and soil. recognize that many natural resources are limited. compare and contrast ways of conserving resources. This includes recycling, reusing, and reducing consumption of natural resources. classify factors that affect air and water quality. describe ways students and schools can help improve water and air quality in our communities. determine some basic factors that affect water quality by conducting simple investigations in the school environment. Students should be able to make and record observations of what happens to runoff water on rainy days. (Related to 1.3.) predict what would happen if natural resources were used up, and explain ways to prevent this from happening. discuss the value of parks to wildlife and to people. <p>Skills</p> <ul style="list-style-type: none"> f. inferences are made and conclusions are drawn about familiar objects and events. h. predictions are based on patterns of observation. i. observations and data are recorded, analyzed, and communicated orally and with simple graphs, pictures, written statements, and numbers. j. simple experiments are conducted to answer questions. 	<p>VASOL p.19-26</p>	<p>AIMS Primarily Earth The Earth has What We Need</p> <p>Cycles of Knowing and Growing Paper Bag Song</p> <p>Enhanced Scope and Sequence Plus Earth's Natural Resources Earth's Resources: Air and Water Reduce, Reuse, Recycle</p> <p>SHIP Recycle It</p>